Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation

A Case Studyof Mabu and Jamuna VDC of Ilam

A Thesis Submittedto

The Departmentof Rural Development,Mahendra Ratna Multiple Campus, Ilam
in Partial fulfillment of the requirements for the
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DEPART
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Letter of Recommendation

The thesis entitled **Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation: A Case Study of Mabu and Jamuna VDC of Ilam** has been prepared by **MingmaDiki Sherpa**under my guidance and supervision. I hereby forward this thesis to the evaluation committee for final evaluation and approval.

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Dev Raj Ghimire

(Supervisor)

Date: 30-05-2073

15-09-2016

Approval Letter

The thesis entitled **Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation: A Case Study of Mabu and Jamuna VDC of Ilam District** Submitted by Mingma Diki Sherpa in partial fulfillment of the requirements for the Master's Degree (M.A) in Rural Development has been approved by the evaluation committee.

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2016/09/30

Declaration

I hereby heartily declare that the thesis entitled **Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation: A Case Study of Mabu and Jamuna VDC of Ilam**has been prepared by **Mingma Diki Sherpa** and submitted to the Department of Rural Development, Mahendra Ratna Multiple Campus, Ilam. It is my original and empirical work prepared under the intellectual guidance of my respected supervisor Ded Raj Ghimire, faculty of the Department of Rural Development. I truly state that I have borrowed all ideas and information from different sources for the preparation of this thesis.

I make due acknowledgements to them declaring that the results of this thesis have not been presented and submitted anywhere else for the award of any degree and for any other proposes. I want to assure that any part of the contents of this thesis has not been published in any form before.

Date: 30-05-2073
15Sept, 2016

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Mingma Diki Sherpa

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Abstract

Ethnobotany is the scientific study of the traditional & indigenous knowledge and customs of a people concerning plants and their medical, religious, and other uses. These indigenous communities having unique knowledge about usage of plant resources for different purposes such as medicine, food, fodder, fuel wood, agricultural equipment's, timber, house hold equipment's, rituals, fencing, roof thatching, manure, rope, animal bedding, poison, color and leaf plates and so on. The tribal and rural people have multifaceted relationship with plant resources for their socioeconomic and cultural activities.

This present study "Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation" was carried out in the Mabu and Jamuna VDCs of Ilam district of Nepal using Ethnobotanical Participatory Appraisal method aimed to document, describe and explain complex relationships between cultures and (uses of) plants, focusing primarily on how plants and it's parts were used, managed and perceived across Sherpa Peoples.

The majority of Sherpa were involved in agriculture followed by business and animal husbandry. Simultaneous to the adopted occupation their major sources of income were agriculture, business, animal husbandry and in the least proportion service and business.

The study was carried out in 30 households of Sherpa community which is 50% of the total households of Sherpa's of Mabu 5 & 8 and Jamuna 1, 5 & 7, by using simple random sampling method.

Out of 30 households, 9 households had monthly income more than Rs10000 followed by 14 households in between Rs5000 to Rs10000 and the 7 households had monthly income less than Rs5000. The average family size of the respondents was 5.13.

The major livestock domesticated by the Sherpa's were cow, goat, ox, horse, hen and pig. There were 84 hens followed by 56 cows and 44 goats within 30 households. Similarly, the number of ox, horse and pig were 4, 2 and 2 respectively. Sherpa's used

to rear hens and goat as their income and also for meat and cow for milk products while ox for tilling the agricultural field.

In this regards, 61 species of plants was identified and documented out of which 25 were tree species for timber, 9 species were tree for fuelwood, 8 species of Non timber forest products and 19 medicinal plant species either in domesticated or in wild form.

The intact relationship of Sherpa and plant resources using their indigenous knowledge led to establish a better platform for biodiversity conservation. Their dependency upon the plant and plants part for food, fuelwood, construction, medicine and even for economic well-being played a crucial role in conservation and sustainability.

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Acronyms/Abbreviations

AD	Anno Domini
CBS	Central Bureau of Statistics
DFO	District Forest Office
DPR	Department of Plant Resources
EPA	Ethnobotanical Participatory Appraisal
HMG	His Majesty's Government
INGOs	International Non-Governmental Organizations
Km	Kilometer
M	Meter
NINPA	Nepal Indigenous Nationalities Preservation Association
NGOs	Non-Governmental Organizations
NPHC	National Population and Housing Census
NTFPs	Non Timber Forest Products
RENAEE	Report for the Establishment of National Academy for Ethnic Elevation
TM	Traditional Medicine
TU	Tribhuwan University
VDC	Village Development Committee

CHAPTER I

INTRODUCTION

1.1 Background

Nepal is one of the rich mega-biodiversity countries of the world having wide variety of plants with medicinal value. Nepal is not only endowed with rich and varied biodiversity but also with scenic splendors and a mosaic of ethnic groups with their rich religious and cultural heritage (Tajpuirya, 2006). Such majestic content of biodiversity has been traditionally used by the people for their sustenance which implies to the fact that nature and human beings are interdependent components of this universe.

Land-locked and sandwiched between two neighboring giants, China and India, Nepal is a land of enormous geographical diversity possessing natural resources where forest plays pivotal role. Nepal bear attractive package of nature embracing rich biological diversity it occupies 0.09% of land area in the world, which has 2.3% of global biodiversity. Green forests are the wealth of Nepal, different types of forest cover are found in different region of Nepal.

Traditional knowledge and practices, acquired by the local ethnic people and inherited from their ancestors, utilize the natural resources widely and wisely for various purposes e.g. Animal and plant products as food, medicine, construction material, clothes, fuel energy etc. Herbal medicines have good values in treating many diseases including infectious diseases, hypertension, that they can save lives of many, particularly in the developing countries, is undisputable. Ethno botany is a relatively new field of study in Nepal, as it is in many other developing countries. Ethno botany deals with the study of plant resources among indigenous communities of an area, especially the tribal and rural people. It has taken its own way of development, depending on local traditions. It is known that the way of administration to cure diseases using a particular plant widely differs among the indigenous people and also Healers, Jhakaris(Manandhar, 2002, Shrestha &Dhillion, 2003).

Nepal is a land of great attitudinal and ethnic diversity. The "National Foundation for Development of Indigenous Nationalities Act 2058 (2002 AD)" has identified 59 ethnic groups as indigenous groups of Nepal. In Nepal, more than 700 species of medicinal

plants used in traditional medicine practices were recorded in the past, and currently 103 species are reported (Tiwari 1999). Many ethnic groups with different customs and languages are residing in this beautiful garden of nature with mutual support and co-operation. In the alpine and sub alpine region of Nepal the traditional practices are highly influenced by Tibetan medicine because of common culture, religion, language and ethnicity in Tibet and the northern region of Nepal where the healers are known as Amchis. The same task in the temperate region is performed by Dhamis and Jhakris, and in the tropical region such healers are known as Guruwa, Bharua and Gurau(Rajbhandari, 2001).

Conservation of this traditional knowledge and practice is highly important since exclusive reliance on the formal western system of medicine has been recognized as an inadequate solution to the problems of health care delivery, and there is no doubt that health is a fundamental right of every human being. But this knowledge and practice are also threatened by lack of conservation practices and a move of younger generations to modern medicine, and therefore, the loss of traditional, often undocumented knowledge. Integration of traditional medicine into national health care, with maximum utilization of local resources and knowledge in sustainable manner, can definitely contribute most. So the present research work is a small effort to document such content of traditional practice of indigenous knowledge in the Dhimal ethnic community of Damak Municipality of Jhapa district.

1.1.1 Plant Diversity in Nepal

Topographically Nepal is a mountainous country with about 83% of its total area consisting of mountains, hills, elevated plain and river valleys. The plant wealth of Nepal is unique and varied. Forest is one of the major resources of Nepal and has been playing significant role in its economy. Approximately 25% of the total area is reported to be under forest and 10.6% is under shrub.

Table 1.1 Plant diversity of Nepal

Groups	Nepal				World	Nepal's participation in %
	Family	Genus	Species	Endemic	Species	
Algae	50	150	687	15	>40,000	1.72
Fungi	80	552	1822	50	>70,000	2.38
Lichens	30	79	471	48	>17,000	2.71
Bryophytes	78	180	853	37	>14,000	6.09
Pteridophytes	31	103	383	-	>12,000	3.19
Flowering plant	213	1,496	5,833	246	>250,000	2.07

(Source: DPR HMG, 1999)

However, Nepal is a small country 90th position by its area but comes in 25th in the world and 11th in Asia by its wealth of biodiversity. Because of its climatic and topographical variation, large number of plants and animals are enjoying their natural environments in the country. Nepal has 5833 species of Phenerodams, which is about 2% of the total identified species of flowering plants of the world. Out of the total plants about 700 species of medicinal plants and 246 species of endemic plants are reported in Nepal.

Comparatively, the study and collection of information of flowering plants than non-flowering plants in Nepal is more, however 471 species of lichen, 833 species of bryophytes, 687 species of algae, 1822 species of fungi and 383 species of Pteridophytes have been enlisted in Nepal. About 248 species of non-flowering plants in Nepal are endemic and are protected in conservation areas. About 20% of land in Nepal is kept as protected area.

1.1.2 Ethnic Distribution of Nepal

Table 1.2 Ethnic Distribution of Nepal

Physiographic Regions	Ethnic Groups
Himalayas	Bhote, Sherpa, Thakali, Dolpo, Lhome(Shingsawa), Lhopo, Larke(Nupriwa), Siyar(Chumba), Mugali, Bahragaunle, Manange, Walung, Thudam(Thudamba), Tangbe, Topke, Gola(Dhokpya), Marphali, Thintan, Syantan,Chhairotan, Byasi
Hills	Chepang, Gurung, Jurel, Lepcha, Magars, Newar, Rai, Sunuwar, Tamang, Thami, Dura, Hayu, Chhantyal, Hyolmo, Pahari, Bhujel/Gharti, Baramo, Surel, Kusunda, Paharee, Kushwadia, Bankariya
Inner Valley	Bote, Danuwar, Kumal, Darai, Majhi, Raji, Raute.
Terai (Madesh)	Dhanuk(Rajbamshi), Dhimal, Koch, Tharu, Meche(Bodo), Kisan, Satan(Santhal), Tajpuriya, Jhangad, Doom, Halkhor, Koin, Lohar, Mali, Pasi, Tatma.

Source: RENAEE

Nepal is a multiethnic, multilingual and multicultural country. However the detailedsurvey on the ethnic groups on Nepal has not been done, the mother tongue statisticsof Nepalese people represent 61 different ethnic groups and more than 75 languages are spoken in Nepal. Tharu, Tamang, Newar, Magars, Rai, Gurung, Limbu and Sherpa are the examples of major ethnic groups of Nepal.

Knowledge concerning wild plants and their uses was up until a few generations ago an essential part of life for the inhabitants of Kapilvastu district of Nepal. On another hand, numerous plants served to supplement the food resources while on the other hand they were indispensable in the treatment of various diseases. Moreover, wild plants, particularly medicinal herbs, have for generations been counted among the most important trading products and in addition have had throughout a decisive role to play within the material culture as well as in the religious-ritual context. At present the empirical knowledge accumulated by experience and handed down over generations is

in the process of dying out. As a result of the introduction of new plants for cultivation, the increasing distributions of chemical based medicines, the opening of markets to the products of western civilizations and the improvement of the general economic situation, traditional plant lore is losing ever more of its significance. Running counter to this development, however, is the increased interest taken by various sciences (e.g. botany, pharmacology, ethnology, geography) in traditional folk wisdom, so that for a number of years now the attempt has been made to return to the sources of traditional plant lore in order to record and document the treasure of knowledge that still exists.

In recent years numerous lists of plants used for consumption, medication and narcotic stimulation, as fodder, timber and fuel, in rituals and for other purposes have been compiled in Nepal (cf. Bibliography). The intention, on one side, is to preserve traditional plant lore as a part of the cultural heritage while on the other side there is the expectation of deriving some commercial use from it. Thus there is little doubt that the discovery of a particularly valuable forage plant or the discovery and development of new plant-based raw materials for drugs which are able to enrich present day therapeutic options are of great economic significance. The increasing interest in plant-based medicines, for example, is one of the reasons why folk medicine has drawn greater attention to itself in recent years. Up to now, however, chemical pharmacological research into medicinal herbs has remained in Nepal – though not only here – in its infancy.

John W. Hershberger introduced the term 'Ethnobotany'. For him and most of the botanist the questions and the focus of the Ethnobotany were of a utilitarian nature, and the organization of the data followed scientific classifications. However, with the adoption of the term by anthropologists also at the end of the last century, the focuschanged to the native's point of view, and his rules and categories for ordering the universe.

Ethnobotany deals with the study of plant resources used by people of indigenous communities of an area. This is the study of the uses to which plant and plant product are part by people of different culture.

1.1.3 Traditional Medicine in Nepal

The term traditional medicine (TM) refers to way of protecting and restoring health that existed before the arrival of modern allopathic medicine. As the term implies, these approaches to health belong to the traditions of each country and have been handed down from generation to generation. TM includes diverse health practices, approaches, knowledge and belief incorporating plant, animal and mineral-based medicines, as well as spiritual and manual techniques and exercise, applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness. A significant portion of the population is still dependent on the traditional practitioners. Basically they follow some ethno-traditional tantric spiritual and ayurvedic knowledge. Although they are not included in the official system of health care system, they are well known by various names in different communities. In most of the communities the mode of preparation and uses of traditional medicinal plants and animals as medicines are highly influenced by folk customs and cultural habits, social practices, religious beliefs and superstitions of the people who prescribe them. Since the practices have been a kind of tradition for people living in remote areas, they are known as traditional medicine. Its preparation and use depends on the accessibility of plants and animals. Most of the people prefer such medicine due to its accessibility, low cost and cultural acceptability.

1.1.4 Indigenous People and Traditional Knowledge System

Nepalese indigenous nationalities are excluded from the mainstream of national policies, and have been legally parted from their ancient natural heritage, biodiversity, ethno biology, foods, medicines, agro-biodiversity, skills, and knowledge of technology, customary law/lore/practice/values, traditional ethnics and sacred sites. Indigenous peoples are contributing their own cultural wisdom on restoration, conservation and wise use of biodiversity, natural resources, and traditional knowledge associated with their life from millennia.

Since, Nepal is a geographically diverse country and consists of a broad range of communities; it is obvious that all these communities have some amount of traditional knowledge. Because of the large number of communities, there has not been any broad research for the documentation of such knowledge. The traditional knowledge system mentioned by Nepal Indigenous Nationalities Preservation Association (NINPA) is a

small fraction of the combined traditional knowledge of the communities. This documented knowledge includes:

1. Use of grounded pulp of khira leaf to kill common pests of wheat like stem borer (chillozonellis). Such practice is done in remote areas by indigenous people (NINPA).
2. Ploughing fields approximately fifteen days before plantation so that exposure of ploughed land to the sun will kill the weeds.
3. A typical community-level traditional knowledge of the Himalayan people is 'SingiNawa'. This means to ask someone before cutting any tree or woods. This custom is practiced in the Sherpa communities of the Himalayas where they ask their leader before cutting any trees or wood. Because of this, people maintain their discipline and do not cut at any time. In the long run, this conserves the forest.
4. Kwati (mixed cereal soup) is prepared by Newari people during JanaiPurnima. Kwati is a kind of soup prepared by the mixture of many types of beans and lentils, which contains a lot of vitamins and is a healthy diet for the body.
5. Use of simrik crimson as a medicine for injuries and bone fracture is also a good example of traditional knowledge practice.
6. Herbs like pongmar and Yarsagumba are used as medicinal tonic. Pongmar is given to the people who have been poisoned. It is believed that pongmar cuts poison whereas Yarsagumba is used as energy tonic. Both are Himalayan herbs.
7. Animal husbandry and crossbreeding of animals are also traditional practices. At the same time, the use of animal dung as an alternative source of fuel is a good example traditional knowledge acquired by the communities.

Although the traditional knowledge used by indigenous peoples has been found to be very useful and effective, it has still been neglected by the world. Traditional knowledge suffers from many threats, including the environment, urbanization, globalization etc. Therefore, different awareness programmers regarding the existence and importance of traditional knowledge of indigenous peoples should be launched through media publications and electronic means. In addition, effective measures should

be implemented to recognize, respect, protect and maintain traditional knowledge through NGOs, INGOs, customary laws of indigenous communities and ratified conventions.

1.2 Statement of the Problem

The upper part of Mabu and Jamuna VDCs of Ilam district are inhabited by Sherpa indigenous people inmajority and are rich in indigenous plant resources. They have higher dependency on plants resources and parts of plants resources for various resolutions such as medicine, food, fodder, grazing, roofing, housing, fuelwoodand timber, which are under the great risk in regards to the day to day growing population followed by demand and supply. The motive for choice of Sherpa Communityfor this particular study is to identify their traditional knowledge on utilizing the plant species and to analyze their contribution in biodiversity conservation and finally to document their knowledge for the next generation to learn and perceive lessons.

1.3 Objectives

The broad objective of the present study is to generalize the indigenous knowledge and socio economic prospect of Sherpa community in regards to ethnobotany while the specific objectives are:

1. To explore the indigenous knowledge system and practices among Sherpa people of the study area.
2. To describe the important plants used by Sherpa for food, medicine, fodder and other purposed.
3. To identify the indigenous knowledge and recommend urgent works to be done to conserve the natural and intellectual property of Sherpa indigenous people.

1.4 Importance of the Study

Mabu and Jamuna VDCs of Ilam district is inhabited by majority of indigenous people and are rich in indigenous plant resources. They are using medicinal, food, fodder and other important plants, which are under the great threat because of illiteracy, poverty, population growth, deforestation, commercial exploitation and increasing use of chemically synthesized medicines. This focused on knowledge and practices of Sherpa

Indigenous Community of within these two VDCs in regards to usage of biological goods. The motive for selection of this indigenous group as well as the topic is because specifically studied were not made in the previous cases regarding this particular issue and the uniqueness of indigenous group in biodiversity conservation.

1.5 Limitations of the Study

1. This study is an academic report carried out for the Master degree dissertation to be submitted in Department of Humanities and Social Sciences, Rural Develpment, MahendraRatna Multiple Campus, Ilamfor partial fulfillment of Master of Rural Development, thus a detailed study was not possible during a very short period.
2. The study basically depends on primary data collected from the indigenous Sherpa community of the study area, which may be inadequate technically or pharmacologically.
3. The whole study was only focused on the Sherpa community of Mabu and Jamuna VDCs of Ilam District of Nepal, so the outcome of this study may not represent to all parts of Nepal.
4. About two months of collecting data may not be enough for proper documentation.

1.6 Organization of the Study

The study has been organized into five chapters. The first chapter includes the introductory part of the thesis comprising the objectives, justification and limitation of the study while the second chapter covers the review of literature relevant to this study. Similarly, the third chapter deals with the methodology of the study and within this section, selection and rationale of study area, study design, population and sample, sampling procedures, sample size, sources and nature of data, methods of data collection, mode of analysis, and report development have been described. The fourth chapter discusses data presentation and analysis of the study. Finally, the chapter five deals with the summary of major findings, conclusion and recommendations of the study.

CHAPTER II

LITERATURE REVIEW

2.1 Ethnobotany

Ethnobotanyis a multidisciplinary science. Being related with almost all branches of natural sciences it tries to find the secret knowledge of rural and tribal people on plants resources, which can be the foundation of multipurpose development of the society. Ethnobotany not only discovers the indigenous knowledge of plant resources but also tries to deal with all aspects of plant conservation.

Ethnobotany deals with the study of plant resources used by people of indigenous communities of an area. This is the study of the uses to which plant and plant product are part by people of different culture. (Mac Milan dictionary of the Environment) Hough (1898), defined Ethnobotany as the study of plants in their relation to human culture. Attaching importance to mythological references and psychological motivations, he tried to go beyond the economic importance of plants and to investigate their religious significance and place in folklore. Although today the two perspectives are objects of two complementary disciplines, economic botany on the one hand and anthropology on the other, they traditionally belong to the field of Ethnobotany, and they should be combined under it. Ethnobotanical investigations should touch not only on the economic values of plants but also the entire range of relations that exist between human and plant populations.

The reliance and easy access of people to the locally available resources to use as medicine by applying their own traditional indigenous knowledge is significant in remote areas. There are several records of plants, along with their medicinal values and uses, listed through research, but only limited work and research has been done on animals, and their detail study and explanation is still lacking. A brief literature search of plants and animals used for traditional medicine practices is presented here.

Manandhar (1990), carried out his study on Danuwars of Siwalik Hills and documented 60 different plant species which have been used in the folk medicinal practice for the treatment of common diseases. He carried out an ethanobiological research on the

traditional medicine practiced among Chepang, Magar, Tamang and Hayu communities from different villages of Chitwan District. He documented 74 medicinal plant species that have been used by the local people for curing 24 different diseases. Manandhar (1991) carried out his study of Tamangs of the midlands and recorded 950 different plant species that have been used for curing a variety of common diseases and disorders. Manandhar (1995), carried out his study on different medicinal plants used by the people in ten villages of Jajarkot District. He reported 60 different species of plants used for treating 25 diseases.

Rijal (1994), conducted his research work on the ethnobotany of Padmapur VDC and the surroundings of forest lands northeast of Chitwan National Park. He documented 185 species of plants with medicinal value, which have been used in the treatment of 126 different diseases. He also documented the indigenous knowledge of people residing in those localities on the use of plants for medicine, fuel wood, fodder, handicrafts, ceremonial and cultural use, by using different techniques.

Chhetry (1996), carried out her study on ethnobotany of the Limbus of Panchther District and recorded 162 species of plants with their medicinal and economic values. Adhikari (1996) carried out his study on impacts of some local plant extracts upon mortality and control of aphid (Lipaphiscrysimi). The host plant selected from 7 different plant species was experimented with. The plants used for extracts were, Adhatodavasica. Artemesia vulgaris, Crysanthemusmorifolium, Meliaazedarach, Nicotianatobacum, polygonumhydropiper and sapium insigne. Adhikari (1997), carried out his study on indigeneous healing practices among Tharus of Amrai village of Narayanpur VDC, Dang District. He recorded 34 ailments treated with different species of plants using l traditional indigenous knowledge.

Manandhar (1998), has documented a total of 47 species of plants used for the treatment of 17 types of diseases among the Raute community of Ampani and Rajaura villages of Dadeldhura District. He recorded 15 new plants species in his study, which were unrecorded from other parts of the country.

Shrestha et.al (2000), published a data base of medicinal and aromatic plants of Nepal. They have documented 1624 species of medicinal and aromatic plants of Nepal, in wild

or cultivated state, belonging to 938 genera and 218 families along with their ethno botanical information.

IUCN (2000), published a book called National Register of Medicinal Plants in Nepal. 150 different medicinal plants, with their scientific information, medicinal use and sites of availability are explained in the book.

Gurung (2003), carried out his study in three VDCS of Tinjure area of Terhathum District, and reported 32 species of medicinal plants belonging to 25 families used by the local people using their traditional knowledge. Balami (2003), reported 119 species of medicinal plants used by the local people of Pharping for the treatment of 35 types of disease.

Ethnobotanical Participatory Appraisal (EPA) is a collaborative approach of Ethnobotany, which guides and evaluates the Ethnobotanical study of an area. The basic aspect of EPA is that there is direct involvement of local tribal and rural people for the study. The tribal and rural people are not only the primary informants but also take part to design the study and research work. They help to develop research tools, data collection, data analysis and discussion of the findings that become the benefit of the community. The researcher was the science teacher of a local secondary school of Jayanagar VDC and thus it was very easy to collect the information from the villagers. Almost all the villagers especially Tharu tribe are so encouraged that they showed their full cooperation to handle the research work under EPA.

2.2 Traditional Medicinal Practices

Ever since the dawn of civilization, humans have been utilizing plants and other things around them for the treatment of various illnesses. This knowledge, on the use of plants in medicine, has been transmitted from one generation to the next in the form of folklore, the knowledge broadening with each successive generation. Such traditional medicinal practice is very much reliable as it is the outcome of a chain oftrail and errors. Eighty five percent of population in underdeveloped world does nothave access to modern western style health care services (Tiwari, 1999) and need to rely on traditional medical system for their health care. Realizing the importance of traditional healthcare system in public health, the role of traditional and indigenous healers was

discussed in the 6th five year plant of then HMG, but actual outcome has remained insignificant (Adhikari, 1998).

At the same time, still most governments and citizens recognize the importance of modern medical system and encourage and accept the use of modern medicines provided by this system, whether they are easily available to the majority of the citizens or not. The traditional medical system with its traditional medicines, especially plant based medicines is belittled, often tagged primitive and discouraged (Quansah, 1994). But in a country like Nepal, where there are only 74 hospitals and 874 doctors (CBS, 1998), traditional medicinal practice plays a vital role in public health.

Due to shortage of trained manpower and facilities, modern health services have not been provided to the greater part of the rural areas, therefore the rural people are largely dependent on traditional medicines. About 85% of the rural Nepalese population depends on local traditional medicine for healthcare (Bhattarai, 1998). Traditional knowledge on medicinal plants and their use is disappearing very rapidly as it is limited to oral tribal folklore. Also medicinal plants are slowly becoming less available due to over harvesting (Thapa, 1998). So, documentation of indigenous knowledge on medicinal uses of plants is a important aspect of Ethnobotany that leads to an wider application of such plants in modern medicine.

Shreshtha (1988), dealt with ethno-botanical information on 100 wild plant species used to fulfill various basic human needs like food, medicine, firewood, timber, fiber, fodder etc by the Tamang tribe of the Kathmandu valley. The particulars of plant species including some less known but potential ones have been described. Attitude of the local Tamang community towards exploitation of vegetation resources and some relevant recommendations have also been highlighted in the paper.

1. Comprehensive documentation of ethno-botanical information.
2. Bio-chemical analysis and phytochemical screening of wild edible and medical plants so as to exploit their real utilities.
3. Dissemination of environmental knowledge to rural illiterate mass on rational utilization of vegetation resources.

4. Incentive towards agro forestry, integrated farming as well as cultivation, collection and processing of wild useful plants through scientific approach.
5. Promotion and improvisation of traditional forest and agro based cottage industries so as to create more income generating as well as off farm employment activities.

In the ethnobotanical study of Palpa area, Shrestha (1985), found 83 plant species used by the rural people, especially the Magar. Uses of the Plant species as food, fodder, fish poison and green manure have been listed with more emphasis on medicinal uses.

In another study of Helambu and adjoining area, Shrestha (1989a), enumerated 72 plant species with their family names, vernacular names, local names (Nepali, Sherpa and Tamang), and the parts used for various purposes by the local people along theHelambu trek route.38 plant species used locally in health care were reported along with methods of use by Shrestha and Pradhan (1986), from the Chobhar village in Kathmandu. They found the plants being used to cure 30 types of diseases and the used of 10 plants were found to be new reports for Nepal. Joshi (1991), enlisted the uses of 57 plant species being used for various purposes by the local inhabitants of Sundarijal and adjacent area of ShivapuriWatershid Area. Sapkota (1994), reported 48 medicinal plant species used in traditional medicine from Palpa district.

A book entitled "Flora of British India" written by Hooker contains a large no of plants of almost all families in its six volumes. This book was reprinted by M/s Bishen Singh and Mahendra Pal Singh. This book intended to comprise within a moderate compass brief description, ordinal, generic and specific of the flowering plants and Ferns hitherto found with in British territories in India together with those of Kashmir and Western Tibet; countries which tough outside that territory belong to botanical regions included with in it, which have been geographically and botanically explored by officers employed almost exclusively in the Indian Service, and which are habitually visited by Indian tourists and travelers.

From his ethnobotanical exploration in three districts of Karnali zone (Mugu, Jumla and Kalikot), Bhattarai (1989), found that the local inhabitants have developed and preserved a very old and strong traditional of using various plants to meet their daily

requirements. He reported 73 plant species being used for various purposes. In one of his papers on urban Ethnobotany, Bhattarai (1989a), described 84 plant species that were commonly used as home remedies to treat various ailments by the urban people of Kathmandu valley. Bhattarai (1994b), also enumerated 54 plant species, used to prepare 60 widely accepted folk prescriptions to treat gynecological complaints, from central Nepal along with description of dose and administration.

A book entitled "Chinese MateriaMedica written by Dr. F. Porter Smith in 1911 and revised by G.A. Stuart in 1985 contains a description of large number of plants, their social, cultural, religious and environmental and medical importance. This book contains botanical names, Chinese names in roman and Chinese script of the plants.

Rijal (1999), made a detailed account of the Ethnobotany of Padampur, a village inside the Chitwan National Park. Along with the description of 345 plant species used by the local people, he has also discussed the level of local peoples' dependency on the adjoining park forests.

Likewise, Adhikari (1998), described 65 plants being used by the tribes of KoshiTappu area, along with their taxonomic description. Similarly, in an ethnobotanical study among the people living in the area of Chitwan National Park, Paudyal (2000), found the indigenous people choosier on the use of plants for various purposes and reported 162 plant species being used by the locals for medicine, food, fodder, firewood, etc.

A book entitled "Indian MateriaMedica" written by Dr. K. M. Nadkani and revised and enlarged his father's edition by A.K. Nadkarni in 1976. This book contains Index list of 2000 Indian plants and drug from which mother tinctures and extracts etc are prepared according to homeopathic system of medicine. The Indian MateriaMedica describes the plants in different headings like: Name of plants in different Indian languages, habitat,and constituents

Arnving, E. in a paper entitled "Madagascar's magical medicines" describes that Madagascar's wild tropical forests grow plants and flowers that have been used by traditional healers for centuries. Medicinal or magical, they provide health cures that locals claim have benefited many generations. Modern scientists are now beginning to

play closer attention to the tropical cures these forests might provide. This paper gives a brief account of Madagascar's herbal medicines, their status, problems and conservation.

Chauhan, N.S. and Khosla, P.K. (1988), in their Paper entitled "Commercially important medical plants of Himanchal Pradesh of India" describe that Himanchal Pradesh has a rich source of crude drugs. These herbs are used extensively for their medicinal, aromatic and phytochemical properties. In this paper 104 plants have been listed that are either available in the wild or that have been extracted and exported on a commercial scale from different regions of the state. The Latin names in the vernacular and the distribution of each plant in the state, with amounts collected have been appended against each name. The plants are described in alphabetical order.

Details regarding the descriptions and uses have been deliberately avoided the plants are enumerated in a table. Edward, D.M. in a paper entitled "The Marketing of non-timber forest products from the Himalayas: the trade between east Nepal and India describes that: every yea, in the Himalayan region in Nepal, thousands of tons of Non timber forest products (NTFPs) are collected from the forests and exported to India. These products leave Nepal almost exclusively as raw materials – fruits, seeds, roots, barks and herbs etc. to be used forthe production of chemicals and herbal extracts and essentials oils. In Nepal, thisenterprise has provided the rural population with income since ancient times.

However, little is known about identification of the products, their role in village life, conservation status, management or marketing. There are only a few examples of adequate management of items traded as non-timber forest products, and some species are being overexploited. Clearly, the trade is an important source of income to

Nepal. This paper provides a background on the NTFPs involvement and describes their marketing at the national, regional and local level. Pohle, Perdita in his book "Useful plants of ManangDistrict: a contribution to the Ethnobotany of Nepal – Himalaya" describes 300 useful wild plants of Gyasumdo, Nyeshang and Nar regions of Manang District of Nepal. The survey of plants from

Manang District reflects a fairly extensive and detailed knowledge on the part of the local population concerning wild plants and their utility. Since they are usually providing their livelihood through the use of various plant resources, whether it is by cultivating grains, vegetables and fruits, through pasturing and the procuring of fodder for livestock during winter or through occasionally trading in herbs, they have developed a close relationship to the plant world. However, knowledge concerning nutritive and narcotic producing plants as well as medicinal herbs is not distributed evenly over the different population groups.

On studying the wild plants from Pokhara and its northern area, Shrestha (1997),reported 93 wild edible plant species, Maden and Dhakal (1998), reported 67 edible wild fruit species representing 30 families' and 51 genera from Koshi zone. Similarly food value of 110 wild plants of Royal Chitwan National park was documented by Mahara(1999), and the plants were categorized into different groups on the basis of the parts used and their harvest procedure.

In "A Glimpse at Useful plants of Nepalganj", Manadhar (1974), mentioned 43 plants being used as food, medicine, timber and in industry. In an ethnobotanical study of Nuwakot (1983), he found the area interesting ethnobotanically and described various uses of 85 plant species among which 7 species had not been reported as medicinal. Later in 1995, Manandhar described medicinal uses of 79 plant species from Makwanpurdistrict, which also includes medicinal uses of 14 species not reported earlier.

Likewise, 74 different plants used to treat about 24 ailments have been discussedtogether with dose and mode of application by Manandhar (1990), in his study on the folk lore remedies of Chitwan district. In another study on the folk lore remedies of Baglung district, Manandhar (1993), documented the medicinal uses, plant parts used and dose of application for 107 plant species used to treat 27 types of diseases. Among these, uses of about 80%plants were found to differ from the reports from other parts and communities of Nepal.

Similarly, Manandhar discussed the traditional medicinal uses of 66 and 80 plant species respectively from Lamjung (1987) and Kaski (1994). Manandhar (1986, also

enumerated 125 plant species, together with their uses, from Jumla district among which 61 species are with medicinal value while 47 species with food value and the other 23 are with miscellaneous uses.

Sing (1968), enumerated 149 species of wild plants with food value and categorized them under six groups on the basis of the parts consumed. Shrestha (1983), found 52 leafy and fruity vegetables in the markets of Dharan and mentioned their edible parts together with the available seasons of the year. Similarly, on the basis of his ethnobotanical studies among different ethnic groups in different parts of the country,

Manandhar (1989, 1991, 1995 and 1997), discussed the food value of 102, 81, 44 and 31 wild plants respectively, together with very brief taxonomic descriptions. There are a number of publications on ethnobotanicalstudies among particular ethnic groups in Nepal Toba (1997), listed 124 cultivated, semi cultivated and wild plants found in the Solukhumbu region that were reported to be economically important by Khalingspeaking people. In another study, Sacherer (1979),found the Ethnobotany of the RolwalingSherpas to be rich. Among a total of 397 different species identified in the region, uses of 80 plant species have been discussed together with their Sherpa names.

Likewise, from the study on the use of medicinal plants among the Gurungs of Kaski, Parbat and Syangja districts, Coburn (1984), described the native uses of 101 plant species together with practices methods.

Similarly from his ethnobotanical studies among the Chepangs of Makwanpur district, Manandhar (1989), reported the used of 107 plant species among which two plants with food value had not been reported earlier. In another study (1989), he again discussed the uses of 102 plants used in traditional medicine among the Chepangs, Manandhar(1986), has also discussed the medicinal uses of 58 plant species among the Mooshartribes of Dhanusa district. 48 wild and 10 cultivated plants have been enumerated along with local names, family names and very brief taxonomic descriptions.

From an ethnobotanical study of the Limbu of Naagi VDC in Panchthar district, Chhetry(1996), found that different plants had their own symbolic meaning and play significant role in the culture and religion of the Limbus, without which certain rituals

cannot be carried on. Limbus were found to make use of 162 plant species and they also have their own way of coping with illness. In another study on Limbus of Morang districts,

Siwakoti and Siwakoti (1998), enumerated 76 plant species used by them. Singh (1995), found 188 plant species being used by the Raute tribe of western Nepal and India. Dhakal (1997) and Kaudinya (1998), studied the Ethnobiology of Kumals in Taranagar VDC of Gorkha and Chirtungdhara VDC of Palpa districts respectively. Both the authors discussed the uses of plants among theKumal people and have reported the used of 264 and 50 plant species in Gorkha and Palpa respectively. Similarly, from an Ethnobiological study of the Gaine tribe in four VDCs of Arghakhanchi district, Nepali (1998), found 204 plant species, representing 72 families, being used by them for various purposes, most of which were used as food.

Similarly, in an Ethnobiological study of the Tamangs of GorsyangVDC in Nuwakot, Tamang (1998), found 183 wild and cultivated plant species being used by the local.Likewise, Mahato (1998), discussed the medicinal uses of 19 most important and common plants used by the tribal people, especially the Magars, of Jhadewa VDC in Palpadistricts. Siwakoti, et al (1997), documented the used of 52 wild food plant species used by the Satars of Eastern Nepal. Mandal and Chaudhary (1992), discussed the traditional medicinal uses of 64 plant species, used by the tribal people of Saptaridistrict, in treating 44 ailments.

Ethnobotanical studies on poisonous plants have also been conducted by some workers. Bhandary and Shrestha (1982), reported 15 poisonous plants from Annapurna and Langtang area. In 1986, they also reported 32 poisonous plants from Manang and Mustang area. In both studies, they have presented information on the toxic nature of the plants and popular preventive measures taken by the local people against suchplants poisoning. Similarly, Manandhar (1989), enumerated 50 plant species usedtraditionally to intoxicate fishes in different parts of Nepal.Along with the above mentioned literature a number of publications are available on the ethnobotanical studies of Tharu communities.

On studying the uses of medicinal plants among the Tharus of Dang Deokhuri district, Manandhar (1985), enumerated 79 plants with their uses. Likewise, in the "Ethnobotanical studies among the ChitwanTharus" Mullet – boker (1093), discussed thoroughly the traditional uses of different plant species. Along with the documentation of the local uses of 61 food plants, 62 medicinal plants and 36 plants used in house construction and material culture, the author has also given lists of

Tharu household items made of plant parts and other Tharu terminology with their pronunciations guide. In an assessment of wild food products used by Tharu (53%) and non-Tharu (47%) people of 5 villages in Bardiya district, Shrestha (Karmacharya) (1993), reported 87 wild food plants among which 34 species were leafy vegetables, 6 were roots and tubers, 40 were fruits and 7 species were mushrooms. 15 wild food plants were also analyzed chemically for nutrient composition. Shrestha and Tiwari (1998) discussed the use of 144 plant species being used by the Tharu and non-Tharu people of 3VDCs in Banke district. Jha et al (1996), have discussed the indigenous knowledge and practices of NTFP management, use and trade by the Tharu of Banke district.

Chaudhary (1994), from his Ethnomedicinal survey inNarayani zone among the Tharusof Rautahat, Bara, Parsa and Chitwan districts and the Chhetries of Makawanpurdistrict, found 52 plant species being used in the treatment of 20 types of diseases occurring in domestic animals. He has also described their use methods in detail. In a documentation of the indigenous knowledge of the Tharu around the Bardiya National Park, Shrestha (1997) discussed the use of 100 plant species being used by the Tharufor various purposes.

Taylor, et al. (1996), studied the antimicrobial activities of 20 medicinal plant parts used by Tharu and non-Tharu ethnic groups living in Banke, Kanchanpur, Dadeldhuraand Dhading districts of Nepal. Taylor, et al. (1996), also studied the antiviral activities of 20 medicinal plant parts commonly used by the native people of the western Terairegion of Nepal.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

In order to keep documents of plant and animal species and its traditional healing practice and indigenous knowledge system of Sherpa community. The data was collected through questionnaire survey to keep record for finding new understanding on ethnobotanical knowledge and practice. The detailed procedure of the sampling and data collection is presented below in a flow chart:

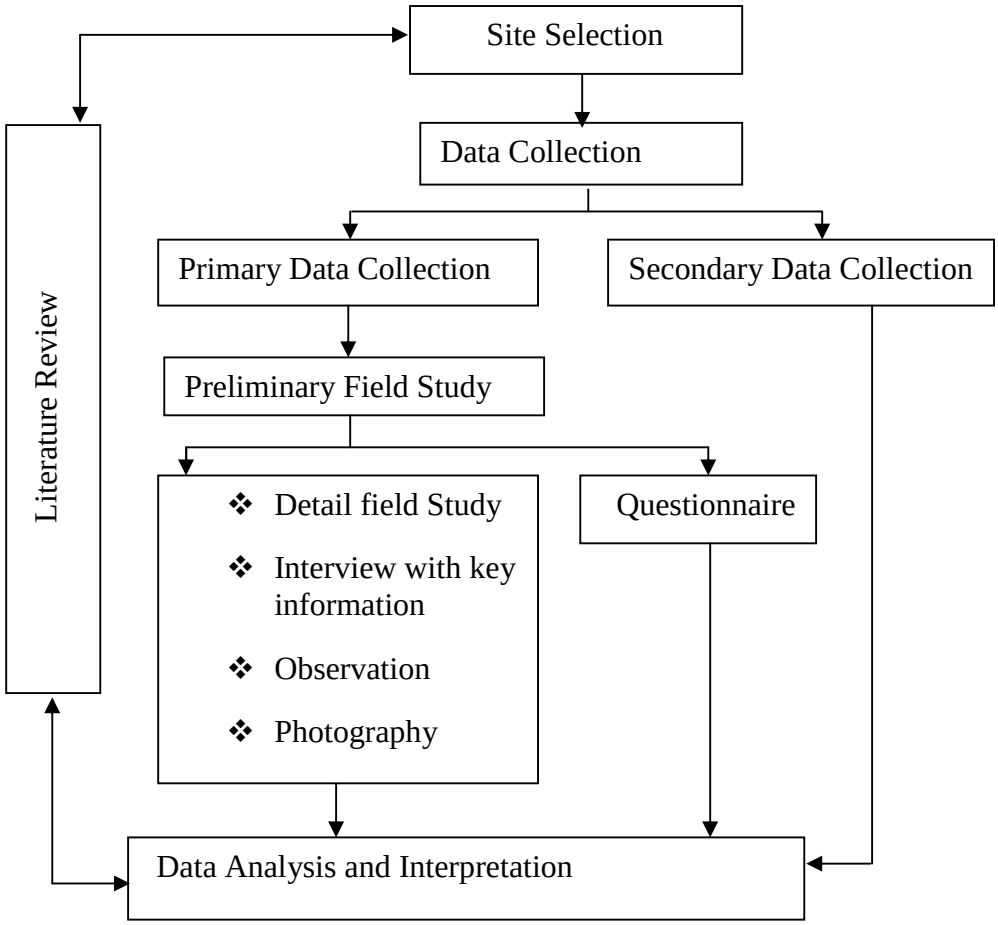

Figure 3.1: Research design flow chart

3.2 Nature and Sources of Data

Both qualitative and quantitative data sources are Sherpa community of Mabu and Jamuna VDCs of Ilam district as study was focused on their dependency, utility, knowledge and practices on plants and parts of plants.

3.3Universe and Sampling

Altogether, 30 sample households from Sherpa community were selected by using simple random sampling method among the 60 households from wards 5 & 8 of Mabu VDC and wards 1, 5 & 7 of Jamuna VDC of Ilam. Beside, key informants and key stakeholders as focus group were selected within the 60 household's representatives on the basis of purposive sampling.

3.4 Data CollectionTechniques

The primary data were collected by using structured questionnaire, checklists, even captured as photographs and through key informants survey, focus group discussions, etc. whereas the secondary date were collected by literature review of related articles, journals, books, submitted thesis, newspapers, etc. The tools and techniques used during the survey has been elaborated in the text below.

3.4.1 Primary Data Collection

Primary data were collected using following different methods.

3.4.1.1 Field Survey

Mabu and Jamuna VDCs were visited to collect the necessary information. The study area focused on the indigenous knowledge of plants usage among Sherpa communityand adequate samples were taken to meet the objectives of the study.

Table 3.1: Sample size and Demographic pattern of research area

VDC	Wards	Total HH	Sherpa HH	Sample HH	Population		
					Male	Female	Total
Mabu	5	72	14	6	153	147	300
	8	83	13	6	177	153	330
Jamuna	1	103	13	6	201	229	430
	7	40	4	4	48	53	101
	5	83	16	8	153	170	323
Total	5	381	60	30	732	752	1484

Source: NPHC, 2011

3.4.1.2 Household Survey

Structured questionnaires were undertaken at random to family members of the sampled households within the study area (Annex I). From the questionnaire survey information about people's perception on conservation, use of plants, availability and methods of use of plants parts, preference of plants for certain use, etc. were collected. Major issues of Ethnobotany were discussed with the members of these households like use, economic value, amount of availability, attribute, problems in conservation, prospects and enterprising etc.

3.4.1.3 Interview with Key Informants

Similarly, key informants were identified in the region and interviewed. A structured interview method was used for the study. Some housewives, faithhealers, farmers and old people was interviewed using a set of questions. Teachers, political and social workers, medicine men will be consulted using an unstructured interview that was basically focused on the history, culture, tradition, socio-economic and present condition of the study.

3.4.1.4 Group Discussion: Ethnobotanical Participatory Appraisal (EPA)

Ethnobotanical participatory Appraisal (EPA)is a collaborative approach ofEthnobotany, which guides and evaluates the Ethnobotanical study of an area. The basic aspect of EPA is that there is direct involvement of local tribal and rural people

for the study. The tribal and rural people are not only the primary informants but also take part to design the study and research work. They help to develop research tools, data collection, data analysis and discussion of the findings that become the benefit of the community. The researcher being the local inhabitant was another crucial part of the study to convince the respondents to take part in the survey.

3.4.1.5 Direct Observation of Activities

A direct and participant observation was applied to collect the information. Beingfamiliar with almost all people of the VDC the researcher could easily make a rapport with the villagers and thus they participated to collect different useful plants and their useful parts were identified and classified.

3.4.2 Secondary Data Collection

Literature review was done to gather secondary data for the study. All the previous studies carried out in the ethnobotany were used as a secondary data. Secondary information were collected from various authorized and reliable sources including books, journals, articles, newspapers, google web, research reports, etc.

3.5Data Presentation and Analysis

Data gathered from field were compiled, classified and tabulated using the software such as Microsoft Office in order to feed the sequential and logical order.Desk review, data interpretation, manipulation and analysis was done to synthesize the descriptive findings of the study.

3.6Report Preparation and Submission

Based on the analysis of the data, major findings, conclusions and recommendation was drawn. A study report was prepared on pre-defined standard given by the department of rural development, Tribhuwan University and has been submitted to the department for approval.

CHAPTER IV

DATA PRESENTATION AND ANALYSIS

4.1 Description of the Study area

The study was carried out in Sherpa community of two VDCs namely Mabu and Jamuna. Total of 30 samples were randomly selected from ward 5 and 8 of Mabu VDC and wards 1, 5 & 7 of Jamuna VDCs of Ilam.

4.1.1 Location

Ilam district was selected as the site for the study.Ilam district lies in Mechi Zone of the Eastern Development Region of Nepal. The districtcovers mountain terrain and rises from 140m above sea level at Setibeni to 3,636m atSandakpur covering an area of 1,714 sq km (DFO 2010). Its geographical coordinates are 26°54'0" North, 87°56'0" East. The district is bordered byPanchthar in the North West, Morang in the South West, Jhapa in the South East andIndia's Darjeeling District in the East. There are 3 Electoral Constituencies in Ilam,comprising of 11 Ilakas, 42 VDCs and 3 municipality. Ilam bazaar at the centermost is thedistrict headquarters.

4.1.2Socio-economic Status of Sherpa Community

Ilam's economy is primarily agriculture based; 88% of the population depends on agriculture. Ilam is known for its Six "A". They are Alu (Potato), Olan (Milk), Alainchi (Cardamom), Aduwa (Ginger), Amliso (Broom grass), and AkabareKhursani (Round chillies), although tea, bamboo, flowers and silk are also produced in Ilam. This district is one of the major places in Nepal for tea-production. It is also famous for natural scenery and landscapes and diverse agriculture.

The total population of Ilam is 290,254 with total households of 64,502 according to the population census of 2011. Ilam has the highest number of *Rai (24%),* an ethnic group. Altogether there are 13 different ethnic groups including *Brahmin, Limbu, Chhetri, Newar*and marginalized groups such as *Sherpa, Sunwar*, etc**.** living in the district.

4.1.3Population Structure of Studied Area

The total population of Mabu and JamunaVDCs were1654 and 1677 respectively (NPHC 2011). Similarly, the total household of Mabu and Jamuna VDCs were734

and777. The table 4.1 below shows the number of Sherpa households in each studied wards of Mabu and Jamuna VDCs.

Table 4.1 Population Structure of Studied area

SN	VDC	Ward	Households
1	Mabu	5	14
2	Mabu	8	13
3	Jamuna	1	13
4	Jamuna	5	16
5	Jamuna	7	4
Total		5	60

Source: Field Survey, 2015

4.1.4Demographic Analysis of Respondents

The questionnaire survey was carried out on30 respondents, among which each 50 percent were male and female. Among the 30 respondents, 50 percent that is 15 out of30 respondents were illiterate followed by 46.7 percent literate and the rest 3.3 percent were highly educated. The table 4.1shows the demographic status of the respondents.

Table 4.2 Demographic Analysis of Respondents

Particular		No. of Respondents	Percentage (%)
Sex	Male	15	50
	Female	15	50
Literacy	Literate	14	46.7
	Illiterate	15	50
	Higher Education	1	3.3
Total		30	100

Source: Field Survey, 2015

4.1.5Economic Status of Studied Households

The majority of Sherpa were involved in agriculture followed by business and animal husbandry. Simultaneous to the adopted occupation their major sources of income were agriculture, business, animal husbandry and in the least proportion service and business. The figure 4.1 below demonstrated their occupation and sources of income.

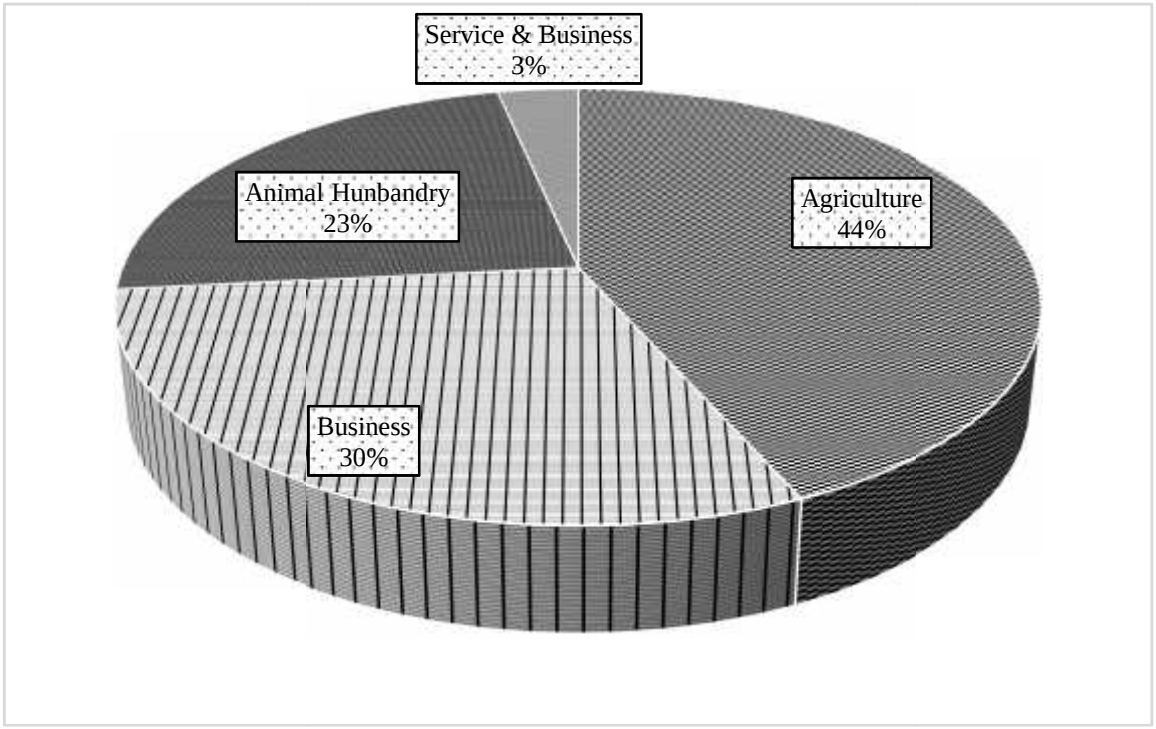

Figure 4.2: Major Sources of Income

Similarly, the economic classification was done on the basis of their annual income during questionnaire survey. Out of 30 households, 9 households had monthly income more than Rs10000 followed by 14 households in between Rs5000 to Rs10000 and the 7 households had monthly income less than Rs5000. The average family size of the respondents was 5.13. The Table 4.3 below depicted the well-being ranking of the studied households.

Table 4.3Average Monthly Income of Households

SN	Number of Households	Monthly Income
1	7	<5000
2	14	5000 to 10000
3	9	>10000

Source: Field Survey, 2015

4.1.5 Land Holding Status of Studied Households

Land owned by the respondents was further divided into three categories. General information about the categorization of land was invented during field observation. Further information about the amount of land owned by the Sherpa households was collected during HH survey. The total amount of upland was 187 ropani. Similarly irrigated agricultural land and private forest was 25 and 28 ropani respectively (Table 4.4).

Table 4.4 Landholding Status of Studied Households

SN	Land Use Pattern	Area in Ropani
1	Upland (Pakho)	187
2	Irrigated land	25
3	Private forest	28
Total		240

Source: Field survey, 2015

4.1.7 Livestock

The major livestock domesticated by the Sherpa's were cow, goat, ox, horse, hen and pig. There were 84 hens followed by 56 cows and 44 goats within 30 households. Similarly, the number of ox, horse and pig were 4, 2 and 2 respectively (Table 4.5). Sherpa's used to rear hens and goat as their income and also for meat and cow for milk products while ox for tilling the agricultural field.

Table 4.5Livestock in Studied Household

SN	Livestock	Number
1	Cow	56
2	Goat	44
3	Ox	4
4	Horse	2
5	Hen	84
6	Pig	2
Total		192

Source: Field Survey, 2015

4.2 Ethnobotany Knowledge of Sherpa

The use of plants and animals for different purpose is widespread throughout the world. In many areas of rural Nepal, knowledge and practice are passed down entirely through the oral tradition and personal experience. This present research adds to that knowledge base, and this paper will be helpful to document ethnobotanical knowledge of Sherpa.

4.2.1 Plants Categorizations

Among 61 plants species used by Sherpa in Mabu and Jamuna, 25 species are tree, 9 shrubs, 19 herbs and 8 NTFPs.

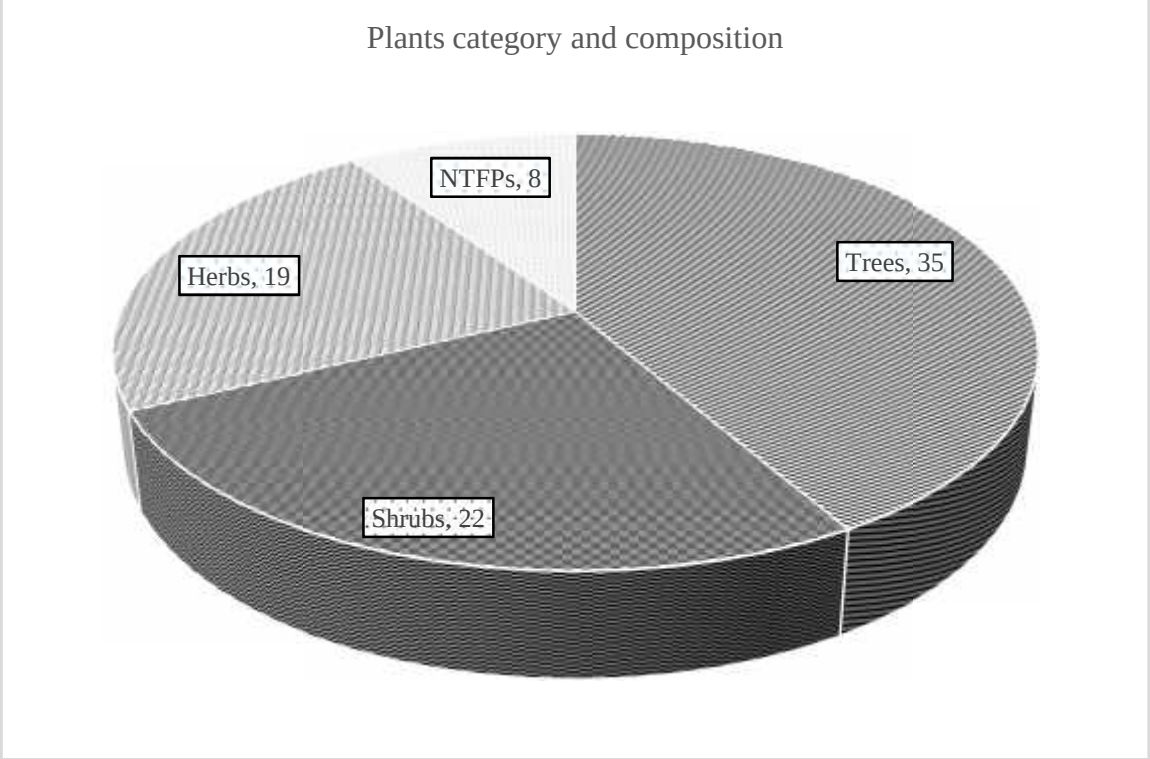

Figure 4.6: Plants category and composition in Mabu and Jamuna

4.2.2 Plants Category and its Parts Used by Sherpa

4.2.2.1 Timber Species

Total 25 tree species were identified to be used by Sherpa for timber. The table 4.2 below enlisted the tree species and their dependency in daily basis.

Table 4.6 Tree Species for Timber

SN	Common Name	Scientific Name	Usages
1	Anthe	*Quercusglauca*	Timber
2	Arupate	*Prunusnepalensis*	Timber
3	Bajrath	*Quercuslanata*	Timber
4	Bhadrakha		Timber
5	Chimal	*Rhododendron barbatum*	Timber
6	Dhapre		Timber
7	Ghoge Champ	*Magnolia campbellii*	Timber
8	Gurans	*Rhododendron arboreum*	Timber
9	Kapase	*Acer hookeri*	Timber
10	Katus	*Castronopsisindica*	Timber
11	Kaula		Timber
12	Kharane	*Ilex fragilis*	Timber
13	Kholme	*Symplocospyrifolia*	Timber
14	LauthSalla	*Taxusbacata*	Timber
15	Lise	*Ilex sikkimensis*	Timber
16	Pahele	*Linderaassamica*	Timber
17	Patale		Timber
18	Phalat	*Quercussemicarpifolia*	Timber
19	Piple	*Linderaheterophylla*	Timber
20	Rani Champ	*Micheliachampaca*	Timber
21	Saur	*Betulaalnoides*	Timber
22	SetoKaulo	*Perseaodoratissima*	Timber
23	Sisi		Timber
24	Tarsing		Timber
25	Utis	*Alnusnepalensis*	Timber

Source: Field Survey 2015

4.2.2.2 Fuelwood Species

Altogether 9 species of plants were used by Sherpa's as fuelwood and as energy source to cook food. The table 4.3 below showed the species used for fuelwood.

Table 4.7 Plant Used for Fuelwood

SN	Common Name	Scientific Name	Usage
1	Angeri	*Lyniaovilifolia*	Fuelwood
2	Bajrath	*Quercussemicarpifolia*	Fuelwood
3	Jhingane	*Euryaacuminate*	Fuelwood
4	Katus	*Castronopsisindica*	Fuelwood
5	Kharane	*Symplocosramosissima*	Fuelwood
6	Kholme	*Symplocospyrifolia*	Fuelwood
7	Malato	*Macarangapustulata*	Fuelwood
8	Mauwa	*Madhucalongifolia*	Fuelwood
9	Utis	*Alnusnepalensis*	Fuelwood

Source: Field Survey 2015

4.2.2.3 Important Shrubs

Mostly 8 species of shrubs were identified during the survey that Sherpa's used for fodder to feed livestock. The table 4.4 below depicted the shrubs species found in Mabu and Jamuna.

Table 4.8 Shrubs Species Used for Fodder

SN	Common Name	Scientific Name	Usage
1	Asare	*Viburnum erubescens*	Fodder
2	Bhalayo	*Rhuswallichii*	Fodder
3	BhaluChinde	*Schefflerаimpressa*	Fodder
4	Jhingane	*Euryaacuminata*	Fodder
5	Kharane	*Symplocosramosissima*	Fodder
6	Kholme	*Symplocospyrifolia*	Fodder
7	Lokta	*Daphne bhoula*	Fodder
8	PatleSisnu	*Laporteaterminalis*	Fodder

Source: Field Survey 2015

4.2.2.4 Medicinal Plants

In studied area it was found that 19 species of medicinal plants were used by Sherpa considering their availability and abundancy. The table 4.5 below enlisted the medicinal plants in Mabu and Jamuna.

Table 4.9 Medicinal Plants Species

SN	Common Name	Scientific Name	Usage
1	Ankhle	*Equisetum ramossimum*	Medicinal
2	Banmula		Medicinal
3	Bojo	*Acoruscalamus*	Medicinal
4	Boketimur		Medicinal
5	BudhoOkhati	*Astilberivularis*	Medicinal
6	Chimphin		Medicinal
7	Chiraito	*Swertiachirayita*	Medicinal
8	Hadchur	*Viscumstellatum*	Medicinal
9	Khanakpa		Medicinal
10	Kurilo	*Asparagus racemosus*	Medicinal
11	LauthSalla	*Taxusbaccata*	Medicinal
12	Majhito	*Rubiamanjith*	Medicinal
13	Padamchal	*Rheum austral*	Medicinal
14	Pakhanbed	*Bergeniciliata*	Medicinal
15	Panchaunle	*Dactylorhizahatigirea*	Medicinal
16	Satuwa	*Paris polyphylla*	Medicinal
17	Setobikhma	*Aconitum bisma*	Medicinal
18	Siltimur	*Litseacubeba*	Medicinal
19	Timur	*Zanthozylumarmatum*	Medicinal

Source: Field Survey 2015

Besides, above mentioned plant species, Sherpa were often used to with harvesting Non timber forest productssuch as Argheli, lokta (*Daphne bholua*), mushrooms, firns (nihuro), sprouts of malingo (Arundinariamaling (malingo),etc for economic growth and for livelihood sustainability.

4.3 Indigenous Knowledge System

Indigenous knowledge of the Sherpa people of Mabu and Jamunawas found to support the livelihood of people to maximum extent. People of the study area were found to use their own knowledge in different livelihood activities like agriculture, preparation and use of domestic materials, storage of food grains for a long time and use of organic insecticides and pesticides. The knowledge system and its use are described under different headings below:

4.3.1 Preparation and Use of Organic Manure

The excreta or dung of domesticated animals like cow, buffalo, goat, pigeon, hen, horse and pigswere collected in a pit for few days or months and used as compost manure in the field to increase the fertility of soil.

4.3.2 Preparation of Agricultural Tools

People of the study area make the essential agricultural tools, such as plough (halo), juwa, dande, doko, namlo from locally available plant resources. These were prepared locally by the Sherpa for their daily activities and indigenous knowledge was orally and practically transferred from generation to generation.

4.3.3 Selection and Use of Wild Edible Foods

Sherpa's were found to use wild edible foods like ban tarul, siltimur, indreni, mushrooms, niguro,malingo tama, chinde, gurans, ainselu, chimphin, boketimur, lohoro,etc either for direct consumption as vegetables or in the secondary form such as local alcoholic beverages.

4.4 Discussion on Major Issues of Plants

Each plant has been cross checked with eight major ethnobotanical issues: use,economic value, amount of availability, attribute, habit and habitat, problems, prospects and enterprising

4.4.1 Ethnobotanical Use of Plants Species

Sherpa have indigenous knowledge on the usage of various plants for all kind of ethnobotanical use mainlyon Food, Vegetable, Pulses, Oils, Fruits, Spices, Cordage, Scents, Dye/ Colours, Firewood, Sticks, Timber, Agricultural Implements, Household

implements, Furniture, Musical Instruments, Building Houses, Fencing, Hedging, Green Fertilizer, Festivals and other religious ceremonies, Rites, Roof thatching, Grass, fodder animal bed, insecticides, pesticides, fish poisoning, Ornamental plants, Beverages, Narcotics, Support to climbers and creepers, Medicine for different disease and problems:

Fever, Typhoid, Malaria, Common cold, Cold, Sinusitis, Wounds and cuts, Nose bleeding, Hiccough, Scabies, Measles, Chicken pox, Ring worm, Dubi , Acne, Asthma, Jaundice, Sprain, Bone fracture, Rabies, Snake bite, Insect bite, TB, Ear pain, Toothache, Tooth decay, Diphtheria, Tetanus,Diarrhoea, Cholera, Dysentery, Rheumatism, Loss of appetite, Vomiting, Nausea, Pneumonia, Piles, Ulcer, Constipation, Cardiac diseases, Respiratory diseases, Weakness, Epilepsy, Gingivitis, Venereal diseases, Gynaecological problems during pregnancy, lactation, delivery, Impotency, Dandruff, Anaemia, Insomnia, Maternity care, Veterinary purposes, Psychiatric problems etc.

4.4.2 Economic Value of Plants

Agriculture was the main occupation of SherpaMabu and Jamuna VDCs so they were highlydependent on various plant species. Economic values of plants are enlisted in the following points:

1. Major food grain, Vegetable and fruits for daily requirements.
2. Timber, firewood, constructional material for housing and other purposes.
3. Jungle as the grazing area and source of fodder for animal husbandry.
4. Plants source of traditional medication.
5. Plants: source of cultural and traditional rites and rituals.
6. Plants resources for fuelwood, fodder and flowers

4.4.3 Attribute

During the study availability, distribution, abundancy of plant species were studied through discussion of EPA and key informants interview. Plants grow in all location and settlements. A detailed discussion was made with key informants about the location and settlements for the plants species. Forest, Cultivated field, Canals damp areas,

jungle, kitchen garden of farmers, bare land, grazing fields were observed closely during the survey tenure.

4.4.4 Problems

Sherpa people are rich in ethnobotanical knowledge and their usage of medicinal plants. Nonetheless, there are someproblems in sustainable and humanitarian use of this indigenous heritage of Sherpa community:

1. Youths are found to be indifferent towards this indigenous heritage of Sherpacommunity as they were migrating and relocating in search of employment and better future.
2. Some literate and youths mentioned this knowledge as the superstition and misconception.
3. Modern medication has direct pressure on this indigenous knowledge and deforestation, overharvesting and forest land encroachment has been a burning issues and threats to the practices.
4. Commercialization of medicinal plants were another threats for extinction of the species.
5. Hesitation of youngster to accept the reality of indigenous knowledge of plant usage and adopting themselves to the sophisticate and dynamic society.

4.4.5 Prospect: Relation with Livelihood

Sherpa are closely related with ethnobotanical knowledge. The prospect of Ethnobotanycan be summarized in the following points:

1. They have a great respect towards Lamas and other faith healers.
2. They first visit to Lamas before modern medication.
3. Sherpa are well doers in agricultural activities followed by Agri-business. They have better knowledge about planting, harvesting etc.
4. Most of the families of Sherpa in Mabu and Jamuna reliant on agriculture and plant for food, timber, fuelwood, fodder and grazing their livestock.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The survey was carried out on 30 respondents, among which each 50 percent were male and female and 15 out of 30 respondents were illiterate followed by 46.7 percent literate and the rest 3.3 percent were highly educated.

Similarly, the economic classification was done on the basis of their annual income during questionnaire survey. Out of 30 households, 9 households had monthly income more than Rs10000 followed by 14 households in between Rs 5000 to Rs 10000 and the 7 households had monthly income less than Rs 5000. The average family size of the respondents was 5.13.

Land owned by the respondents was further divided into three categories. The total amount of upland was 187 ropani. Similarly irrigated agricultural land and private forest was 25 and 28 ropani respectively.

The major livestock domesticated by the Sherpa's were cow, goat, ox, horse, hen and pig. There were 84 hens followed by 56 cows and 44 goats within 30 households. Similarly, the number of ox, horse and pig were 4, 2 and 2 respectively.

Among 61 plants species used by Sherpa in Mabu and Jamuna, 25 species are tree, 9 shrubs, 19 herbs and 8 NTFPs.Total 25 tree species were identified to be used by Sherpa for timber.

Altogether 9 species of plants were used by Sherpa's as fuelwood and as energy source to cook food. Mostly 8 species of shrubs were identified during the survey that Sherpa's used for fodder to feed livestock. 19 species of medicinal plants were used by Sherpa considering their availability and abundancy.

5.2 Conclusion

The present study showed that the Sherpa people of Mabu and Jamuna VDCs ofIlam district are ethno-botanically richer and their indigenous system of usage was crucial for the biodiversity conservation. They use plant resource for food, fodder, firewood, medicine, timber and for other various purposes such as thatching, fencing, handicraft, fiber, ceremonies, spices, cordage and rope, broom, stick, agricultural implements, domestic items etc. the make use of all sorts of accessible plant resources.

All together 61 species were studied among hundreds of plants being used by Sherpa people in the study area. Some species still remain to be identified scientifically. This vast knowledge on Ethnobotany is poorly handed over to the young generation of Sherpa due regards to modernization and relocation of them in search of employment and better livelihood option.Although the Sherpa of the study area are dependent on agriculture for their living, they also depend on the animal husbandry and business for their livelihood. Among the plants studied by the researcher 25 species were tree species, 9 shrubs, 8 NTFPs and 19 medicinal plant species both in domesticated and wild form.

Although a large number of Sherpa still consider the restriction on forest use as an intervention to their traditional rights, there are anadequate number of youngsters conservationist and lamas who feel the need for conservation of natural resources since conservation practices ensure sustainable availability of these important plants in future too.

5.3 Recommendations

1. Sherpa are highland residents and indigenous people of Mabu and JamunaVDC of Ilamdistrict. They have good knowledge on plants species and their uses although their certain alteration have been experienced in their traditional way of presence. Proper documentation of the existing knowledge could be a huge asset in the future days for upcoming generation.
2. Each Sherpa family need to be encouraged for establishment of biogas plant for energy alternative to save the remaining forest and forest products.

3. A further study on Ethnobotany ofSherpacommunity are recommendedto disseminate information on the indigenous knowledge and practices on biodiversity conservation and knowledge of ethnobotany.
4. Domestication of medicinal plants for the economic well-being and to raise the better option of livelihood.
5. Medicinal Herbs processing unit should be established in Mabu and Jamuna VDCs to encourage people in cultivating and conserving medicinal herbs and to create employment opportunity for the local dwellers.

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ANNEXES

Ethnobotany and Indigenous Knowledge System of Sherpa People Incorporating Culture and Biodiversity Conservation

(A Case of Mabu and Jamuna VDC of Ilam)

Annex I : Questionnaire for Household Survey

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Questionnaire No.		

i. District		**ii. VDC/Municipality**	
iii. Ward No.		**iv. Tole/Settlement**	
v. Name of Household owner			
vi. Average monthly income of household (NRs)			
vii. Main source of income			

	Male	Female	Total
i. No. of persons in household:			

Respondent's Identification

1. Name:

2. Sex [SA]

Female 1	Male 2

3. Age _____

4. Educational Status: [SA]

Illiterate	101
Literate but no formal education	102

Completed up to	

5. Caste/Ethnic group: [SA]

Limbu	201	Sherpa	202	Magar	203	Tamang	204	Newar	205
Rai	206	Gurung	207	Bahun	208	Chhetri	209	Others	XX

6. What is your main occupation? [SA]

Agriculture	1
Industry/Business	2
Service	3
Labor	4
Student	5
Housewife/house-maker	6
Retired	7
Unemployed	8
Other (specify) _____	XX

7. What is the major source of income for your family? [SA]

Agriculture	1
Industry/Business	2
Service in the country	3
Remittance (service outside the country)	4
Wage-labour in the locality	5
Retirement pension	6
Other (specify) _____	XX

8. Land Holding-Ropani (1 ropani =0.05 ha)

Upland (Pakho)	Irrigated Land (Khet)	Private Forest	Total Land

9. Number of livestock's

Livestock	Number	Fodder in Bhari
Cow		
Buffalo		
Ox		
Goat		
Hen		
Duck		
Horses		
Others		

General Information

1.Which fuel types do you use in your home for cooking and heating?

Fuel Type	Quantity used	Cost (in Rs.)	Time taken for fuel collection
Firewood a. Community Forest b. Private Forest c. Others			

Kerosene			
LPG Gas			
Electricity			
Biogas			
Others			

Information of benefit from forest product analysis/ Leakage analysis/ Opportunity Cost

1. How often are you allowed to collect products from Kipat Forest?

Products	Quantity in Bhari	Frequency of Collection	Time taken for collection	Mode of marketing (free or paid)
Timber				
Firewood				
Fodder				
…….				
…….				
Water	*(Quantity in Gagro)*			

2. Is it free of cost? Or you have to pay for the entry.

Free	1
Pay (specify Rs./year)	Rs.....

3. How much are you allowed to collect in each time of your entry from your demand?

Product	Quantity needed	Quantity received (last year)

Timber		
Pole		
Firewood		
Fodder		
NTFP Medicinal use a. b. c.		
Medicinal use a. b. c.		
Edible use a. b. c.		
Other products (non-edible and non-medicinal, for eg. Lokta, roofing, etc) a. b. c.		
Litter		
Others		

4. Are you allowed to rear or graze your animals in the Kipat forest?

Animal type	Yes (1)	No (2)
Cows		
Buffaloes		
Ships		
Goats		
Horses		
Others		

5. Does the harvested/collected product meet the household needs?

Products	Yes (1)	No (2)
Timber		
Pole		
Firewood		
Fodder		

6. If no....How do you meet the forest products requirements?

Use of alternative source	1
Harvest from the nearest forest	2
Private forest	3
Agriculture residue	4
Others	

7. What kind of protection measures you adopt to reduce destruction from natural disasters (fire, flood and landslide)?

8. How many member of house work out of village?

Sex				Employment			
	Government	NGO/ INGO	Own Business	India	Out of country	Total no employment	Remark
Female							
Male							

9. What kind of traditional skill your household members know?

A:

B:

C:

D:

E:

9. What kind of traditional skill are you continuing?

A:

B:

C:

D:

E:

10. Do you have market for your traditional products?

Yes	1
No	2

11. If yes, where do you sell it?

Within district	1
Other cities of Nepal	2
Outside the country	3

Thank You,

Researcher

MingmaDiki Sherpa

Master Degree

Rural Development Date: November 2015

.....

Additional Information

Historical Events

Date	Events	Effects

Map of the Study area

Some Glimpses of the Study

1. Reaseacher During the Field Survey

2. Dependency of Sherpa in Timber and Firewood

3. Livestock and Grazing Land of Study Area

4. Forest and Medicinal Plant

5. Medicinal Plants Species Used by Sherpa

6. Medicinal Plants Species Used by Sherpa